



1/25/2006 1:15:14 PM

Process Sheet

AR001 Dart Helicopters Services Drawing Name : 206L FWD X-TUBE
 : 10553
 : N/A
 This Issue : 1/25/2006 S.O. No. : N/A
 Prsht Rev. : NC
 First Issue : N/A Type : LANDING GEAR
 Previous Run : 25604
 Part Number : D206667103
 Drawing Number : D206-667-143 REV B
 Project Number : N/A
 Drawing Revision : B
 Material : N/A
 Due Date : 2/28/2006 Qty: 1 Um: Each
 Written By : SEE COMMENT BELOW
 Checked & Approved By : KA 06.01.27
 Comment : Est Rev: F 05.09.01 Add holes for compatibility with Bell
 Skid tubes KJ/JLM

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 DC DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D206-667-103 CHG002

DH 04/03/06

2.0 D6002115 Crosstube material



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6002-115 Crosstube 1310511

Check OD = 2.250"; ID = 1.750"

BG 06.02.26

3.0 MORI SEIKI MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA087

2-Turn first side as per Folio FA087

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D206-667-143. BG 06.02.26

4.0 QC1 INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

BG 06.02.26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes ☒ No ☐ DQA: ☒ Date: 06/03/05
 QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
06.04.07	3	One cuff is 2.238" OD for a 1/2" long section. See FAI sheet attached	CP 06.04.07 per QSI 042	PART IS OK. See attached DS email & analysis for substantiation	BG 06.02.24	 06.04.17	CP 06.04.07 per QSI 042	 06.04.17

NOTE: Date & initial all entries

Date: Wednesday, 1/25/2006 1:15:15 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 206L FWD X-TUBE

Job Number: 25605

Part Number: D206667103

Job Number:



Seq. #: Machine Or Operation: Description :

5.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA087

2-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D206-667-143.

3-Polish entire outside surface of crosstube

4-Remove sand and plugs.

5-Scribe part # and batch # using vibrating stylus as per Dwg D206-667-143

BG 06-02-26

6.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

BG 06-02-26

7.0

QC8

SECOND CHECK



Comment: SECOND CHECK

Er 06/04/17

8.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

25 06-04-17 ①

9.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D206-667-143 using CNC bender program 206L-fw and Folio FT017

DP 06-4-17

10.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

11.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube using drill Jig DT8541 & DT8542 as per Dwg D206-667-143. Drill all (3) top holes.

2-Drill and Ream all holes in tube to finish size using drill Jig DT8541 & DT8542 as per Dwg

06-04-17

Dart Aerospace Ltd
W/O:

WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
	0						

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 1/25/2006 1:15:15 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 206L FWD X-TUBE

Job Number: 25605

Part Number: D206667103

Job Number:



Seq. #:

Machine Or Operation:

Description :

D206-667-143 Check dimensions between holes on all four sides.

3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins. *pm 06-04-240*

4-Drill pilot holes using drill Jig DT8541 & DT8542 as per Dwg D206-667-143. Drill only the top (2) holes. *pm 06-04-240*

5-Drill & ream the top (2) holes to finish size using drill Jig DT8541 & DT8542 as per Dwg D206-667-143 *pm 06-04-240*

6-Drill Fwd rivet holes using drill Jig DT8787FWD as per Dwg D206-667-143. Note: Fwd side has 3x top holes. *pm 06-04-240*

7-Drill Aft rivet holes using drill Jig DT8787AFT as per Dwg D206-667-143. *pm 06-04-240*

8-C'sink holes as per Dwg D206-667-143. Allow rivet to sit below surface to compensate for paint. *pm 06-04-240*

9-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D206-667-143 *pm 06-04-240*

12.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

13.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

14.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

15.0

OUTSIDE SERVICE

OUTSIDE SERVICES



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038Or

Issue P/O: 1078 LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

16.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 1/25/2006 1:15:15 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 206L FWD X-TUBE

Job Number: 25605

Part Number: D206667103

Job Number:



Seq. #:

Machine Or Operation:

Description :

17.0

QC6

DIMENSIONAL CHECK



Comment: Inspect for damage & ensure results are as per Dwg D206-667-103

18.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

19.0

QC14

Inspect Spray Paint



Comment: Inspect Spray Paint

Wrap in plastic bag to protect from scratches

20.0

D2856400

Abrasion Strip



Comment: Qty.: 1.2138 f(s)/Unit Total : 1.2138 f(s)

Pick:

Qty Part number Description Batch

2 D2856-400(Cut to 6.94") Abrasion Strip

B26091 DP06-5-4

21.0

D2873043

Nut Plate Assembly



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2873-043 Nut Plate

B25052 DP06-5-4

22.0

D2873045

Nut Plate Assembly



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2873-045 Nut Plate

B25053 DP06-5-4

Dart Aerospace Ltd
W/O:

WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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NOTE: Date & initial all entries

Date: Wednesday, 1/25/2006 1:15:15 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 206L FWD X-TUBE

Job Number: 25605

Part Number: D206667103

Job Number:



Seq. #:

Machine Or Operation:

Description :

23.0

D28911

Support 2.25 dia



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2891-1

Support

B21494 DP06-5-4

24.0

MS20601AD4W8



Comment: Qty.: 14.0000 Each(s)/Unit Total : 14.0000 Each(s)

Pick:

Qty Part number Description Batch

14 MS20601AD4W8

Rivet

M18523

DP06-5-4

25.0

MS2192020

Clamp



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-20

Clamp

M15936

DP06-5-4

26.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install abrasion strips as per QSI 035 using DT8579. .Note: (3) top holes should be facing up.

2-Install supports and clamps as per Dwg D4206-667-143. Torque clamps to 80-100 in lb

3-Install nut plates as per Dwg D206-667-143. Touch-up rivet heads with Imron paint.

DP06-5-4

27.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

BE 06-05-05

28.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 1/25/2006 1:15:15 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 206L FWD X-TUBE

Job Number: 25605

Part Number: D206667103

Job Number:



Seq. #:

Machine Or Operation:

Description :

29.0

AN57A

Bolt



Comment: Qty.: 10.0000 Each(s)/Unit Total : 10.0000 Each(s)

Pick:Packing Kit

Qty Part number Description Batch

10 AN5-7A

Bolt

30.0

AN530A

BOLT



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:Packing Kit

Qty Part number Description Batch

4 AN5-30A

Bolt

See attached

31.0

AN960JD516

Washer



Comment: Qty.: 10.0000 Each(s)/Unit Total : 10.0000 Each(s)

Pick:Packing Kit

Qty Part number Description Batch

10 AN960JD516

Washer

32.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

33.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D206-667-103

Location: _____

PPP Rev: _____

34.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Inspection Level 21

Job Completion



Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 3/29/2006 7:53:23 AM
 User: Linda Lacelle

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: 206L FWD X-TUBE
Job Number	: 25605		
Estimate Number	: 10553		
P.O. Number	:	Part Number	: D206667103
This Issue	: 3/29/2006	S.O. No.	:
Prsht Rev.	: NC	Drawing Number	: D206-667-143 REV B
First Issue	: 1/25/2006	Project Number	: N/A
Previous Run	: 25604	Drawing Revision	: B
Written By	:	Material	:
Checked & Approved By	:	Due Date	: 2/28/2006
Comment	: Est Rev:F 05.09.01 Add holes for compatibility with Bell Skidtubes KJ/JLM		
		Qty:	1
		Um:	Each

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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28.0	PACKAGING 1	PACKAGING RESOURCE #1
------	-------------	-----------------------



Comment: PACKAGING RESOURCE #1
 Pick Packing Kit

29.0	AN532A	Bolt
------	--------	------



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
 Bolt

M13884

✓

30.0	MS21042L5	Nut
------	-----------	-----



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
 Nut

M19073

✓

31.0	AN57A	Bolt
------	-------	------



Comment: Qty.: 10.0000 Each(s)/Unit Total : 10.0000 Each(s)
 Pick:Packing Kit

Qty Part number	Description	Batch
10 AN5-7A	Bolt	M18536

✓

32.0	AN530A	BOLT
------	--------	------



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
 Pick:Packing Kit

Qty Part number	Description	Batch
4 AN5-30A	Bolt	M19512

Date: Wednesday, 3/29/2006 7:53:23 AM
User: Linda Lacelle

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 206L FWD X-TUBE

Job Number: 25605

Part Number: D206667103

Job Number:



Seq. #:

Machine Or Operation:

Description :

33.0

AN960JD516

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)

Pick: Packing Kit

Qty Part number Description Batch

18 AN960JD516 Washer 119185 ~

AB 06/05/05 (1)

34.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

06/05/05 (1)

35.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D206-667-103

Location: _____

PPP Rev: B

06/05/05 (1)

36.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Inspection Level 21

06/05/05 (1)

Job Completion



W 06/05/05

DART AEROSPACE LTD	Work Order: 25605
Description: Crosstube Assembly (206L High Fwd)	Part Number: D206-667-143
Inspection Dwg: D206-667-143 Rev: A2	Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.242	✓	✓		2.238/2.242
	1.982	+0.005/-0.000	1.987	✓			The end of the
	2.019	+0.005/-0.000	2.024	✓			cuff on the
	2.058	+0.005/-0.000	2.063	✓			taper side
	2.097	+0.005/-0.000	2.102	✓			is u/s by
	2.136	+0.005/-0.000	2.141	✓			.003 for
	2.176	+0.005/-0.000	2.181	✓			approx 1/2"
	2.201	+0.005/-0.000	2.206	✓			
	0.125	+/-0.010	.125	✓			
	0.400 x 30°	+/-0.010	.400	✓			
	R0.063	+/-0.010	.063	✓			
	R0.500	+/-0.010	.500	✓			
	4.438	+/-0.030	4.438	✓			
SIDE B	104.98	+/-0.020	104.98	✓			
	2.240	+0.005/-0.000	2.242	✓			
	1.982	+0.005/-0.000	1.986	✓			
	2.019	+0.005/-0.000	2.023	✓			
	2.058	+0.005/-0.000	2.063	✓			
	2.097	+0.005/-0.000	2.102	✓			
	2.136	+0.005/-0.000	2.141	✓			
	2.176	+0.005/-0.000	2.181	✓			
	2.201	+0.005/-0.000	2.204	✓			
	0.125	+/-0.010	.125				
	0.400 x 30°	+/-0.010	.400				
	R0.063	+/-0.010	.063				
	R0.500	+/-0.010	.500				
	4.438	+/-0.030	4.438				

Measured by: BG	Audited by: EN	Prototype Approval:	N/A
Date: 06.02.26	Date: 06/04/17	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	04.05.06	New Issue (P/O D206-667-103)	KJ/RF	



DESIGN PH	DRAWN BY PH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED HDS	APPROVED HDS	DRAWING NO. D206-667-143	REV. B SHEET 1 OF 3
DATE 05.07.26		TITLE CROSSTUBE ASS'Y (206L HIGH FWD)	SCALE NTS
A	00.11.17	NEW ISSUE	
B	05.07.26	ADD HOLES AND NUT PLATES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	

RELEASED
05-07-26

Qty	Part Number	Description
X	D206-667-143	CROSSTUBE ASSEMBLY (206L HIGH FWD)
1	D6002-115	CROSSTUBE
2	D2873-043	NUT PLATE
2	D2873-045	NUT PLATE
2	D2856-400-694	ABRASION STRIP
2	D2891-1	SUPPORT
14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
4	MS21920-20	CLAMP

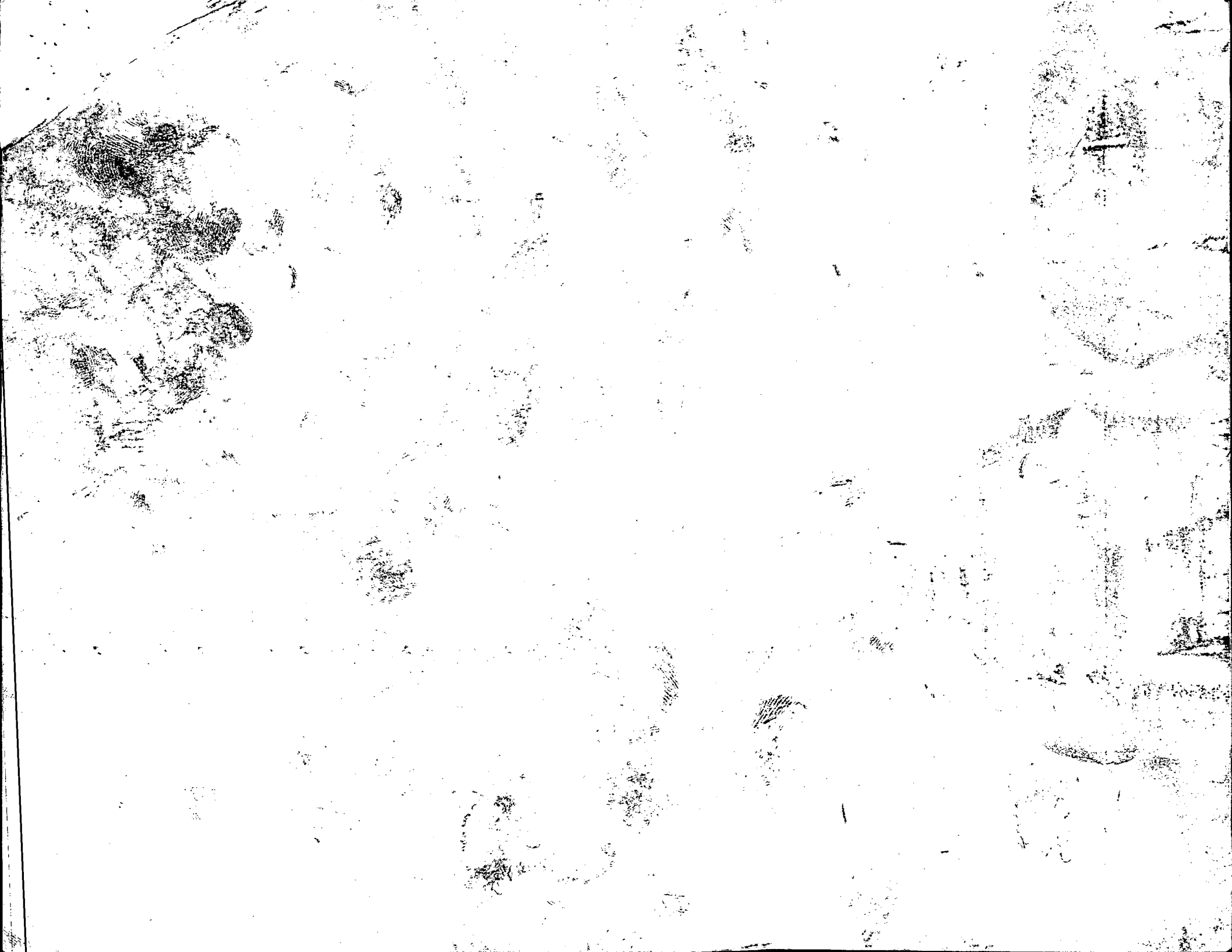
GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6002-115
FINISHED LENGTH = 104.98 ± 0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 10 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-400-694 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D2891-1 SUPPORT, PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) IT IS OPTIONAL TO SEAL EDGES OF SUPPORTS AND ABRASION STRIP USING SIKAFLEX-241/291 SEALANT.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB.

COPY
RETURN TO
ENGINEERING
CONTROLLED COPY
NOT TO AMENDMENT
NOTICE
W/ ORDER
25605

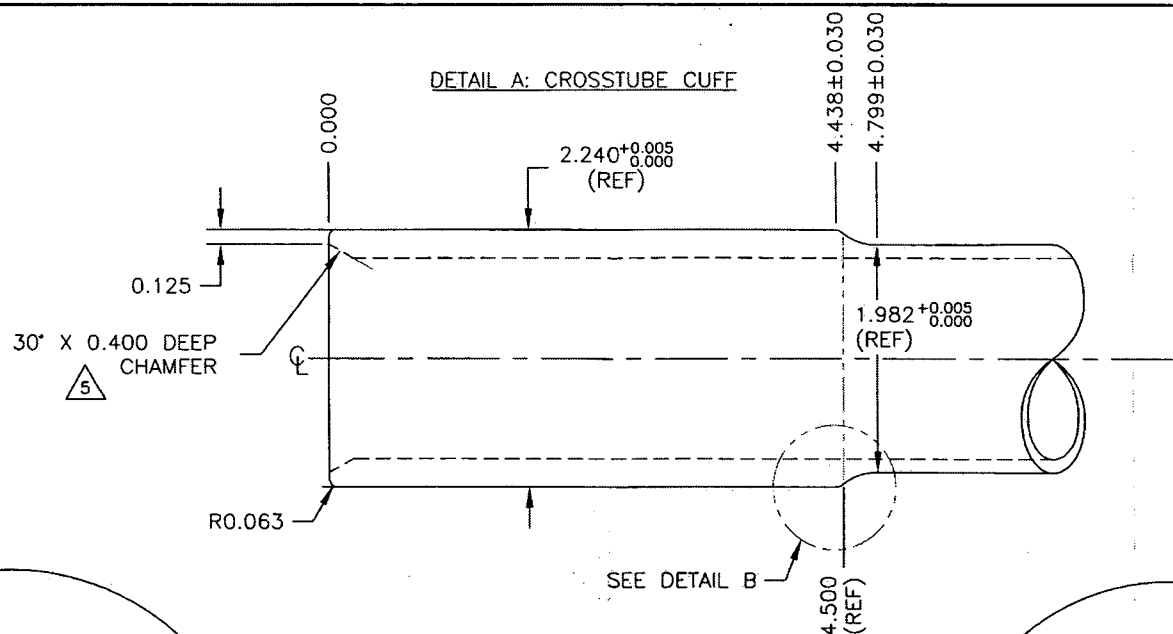
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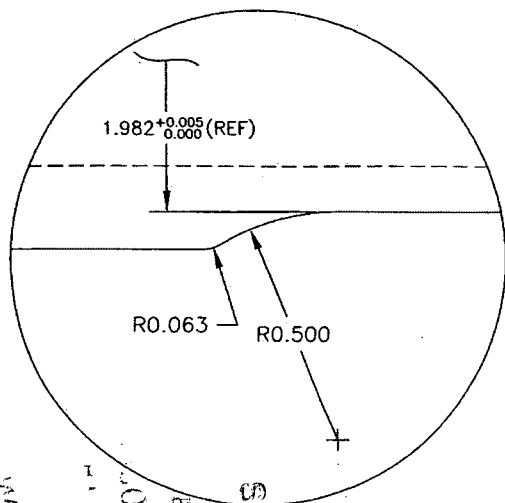


RELEASED
05.07.26

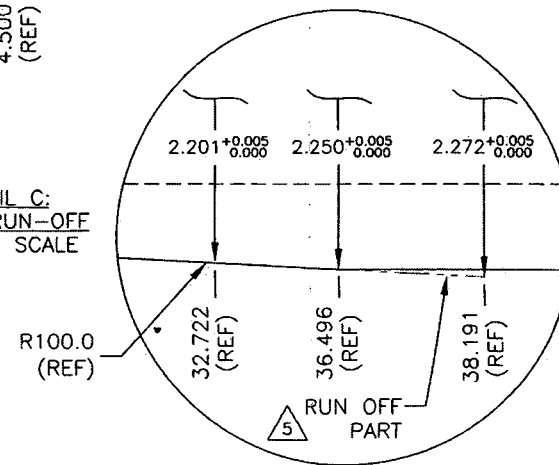
DETAIL A: CROSSTUBE CUFF



DETAIL B: CUFF
TRANSITION
SCALE 4:1



DETAIL C:
TAPER RUN-OFF
NOT TO SCALE



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DART AEROSPACE LTD.

DESIGN PH	DRAWN BY PH	DART	DART AEROSPACE LTD. MISSISSAUGA, ONTARIO, CANADA
CHECKED HOS	APPROVED HOS	DRAWING NO. D206-667-143	REV. B SHEET 3 OF 3
DATE 05.07.26	TITLE CROSSTUBE ASS'Y (206L HIGH FWD)	SCALE 1:1	

SHOP COPY
RETURN TO
ENGINEERING
CONTROLLED COPY
1:1 TO 1:1 NOMINAL

25605

Chris Provencal

From: David Shepherd [davids@dartaero.com]
Sent: April 6, 2006 4:50 PM
To: Chris Provencal
Cc: Linda Lacelle
Subject: Re: NCR for D206-667-143

Chris,

I agree with the calculations you sent by fax.
Therefore, D206-667-143 B25606 is an acceptable deviation.
Please attach a copy of your analysis as well as a copy of this email to the work order.

With respect to D206-667-143 B25605, please do a similar calculation and attach it to the work order.
If you get a positive margin, you can use this email as proof of my acceptance of the part.

David

----- Original Message -----

From: "Chris Provencal" <cprovencal@dartaero.com>
To: "David Shepherd (E-mail)" <davids@dartaero.com>
Sent: Thursday, April 06, 2006 10:53 AM
Subject: NCR for D206-667-143

> David,
>
> I sent you a fax regarding some under toleranced crosstubes. I talked to
> you before about this (about a month ago), the SR shows negative margins
so
> per your suggestion I compared the bending moments to the bending moments
at
> the support. I figured you could sign the fax if you agreed with it and
I'd
> attach it to the work orders, that way there's two signatures saying they
> agree with the calculation.
>
> Sincerely,
> Chris Provencal
> DART Aerospace Ltd.
> Email..cprovencal@dartaero.com
> Phone...613-632-3336
> Fax.....613-632-4443
>
>

CP 06.04.07

This calculation looks at a D206-667-143 xtube (b/n 25606) that is under tolerance.

Geomerty at support:

$$2.250'' \text{ OD} \times 1.750'' \text{ ID}, I_1 = \pi/64(2.250^4 - 1.750^4) = 0.798 \text{ in}^4$$

$$\text{Distance from skidtube center to edge of support, } d_1 = 27.884''$$

At undertolerance location A:

$$2.092'' \text{ OD} \times 1.750 \text{ ID}, I_A = \pi/64(2.092^4 - 1.750^4) = 0.480 \text{ in}^4$$

$$\text{Distance from skidtube center to location A, } d_A = 12.537''$$

At undertolerance location B:

$$2.053'' \text{ OD} \times 1.750 \text{ ID}, I_B = \pi/64(2.053^4 - 1.750^4) = 0.412 \text{ in}^4$$

$$\text{Distance from skidtube center to location B, } d_B = 9.599''$$

At undertolerance location C:

$$2.017'' \text{ OD} \times 1.750 \text{ ID}, I_C = \pi/64(2.017^4 - 1.750^4) = 0.352 \text{ in}^4$$

$$\text{Distance from skidtube center to location C, } d_C = 6.660''$$

Can't have more vertical force than what the support allows (support provides the actual force), but actual sections near cuff should allow for more (undertolerance section is allowable)

$$\text{Allowable/Actual bending} \Rightarrow F_{TU} = Mc/I = Fdc/I \Rightarrow F_{ABC}/F_1 = (I_{ABC} \cdot d_1 \cdot c_1) / (I_1 \cdot d_{ABC} \cdot c_{ABC})$$

$$MS_A = (0.480 \cdot 27.884 \cdot 1.125) / (0.797 \cdot 12.537 \cdot 1.046) - 1 = 0.44$$

$$MS_B = (0.412 \cdot 27.884 \cdot 1.125) / (0.797 \cdot 9.599 \cdot 1.027) - 1 = 0.65$$

$$MS_C = (0.352 \cdot 27.884 \cdot 1.125) / (0.797 \cdot 6.660 \cdot 1.009) - 1 = 1.06$$

For D206-667-143 (b/n 25605) that is undertolerance at cuff:

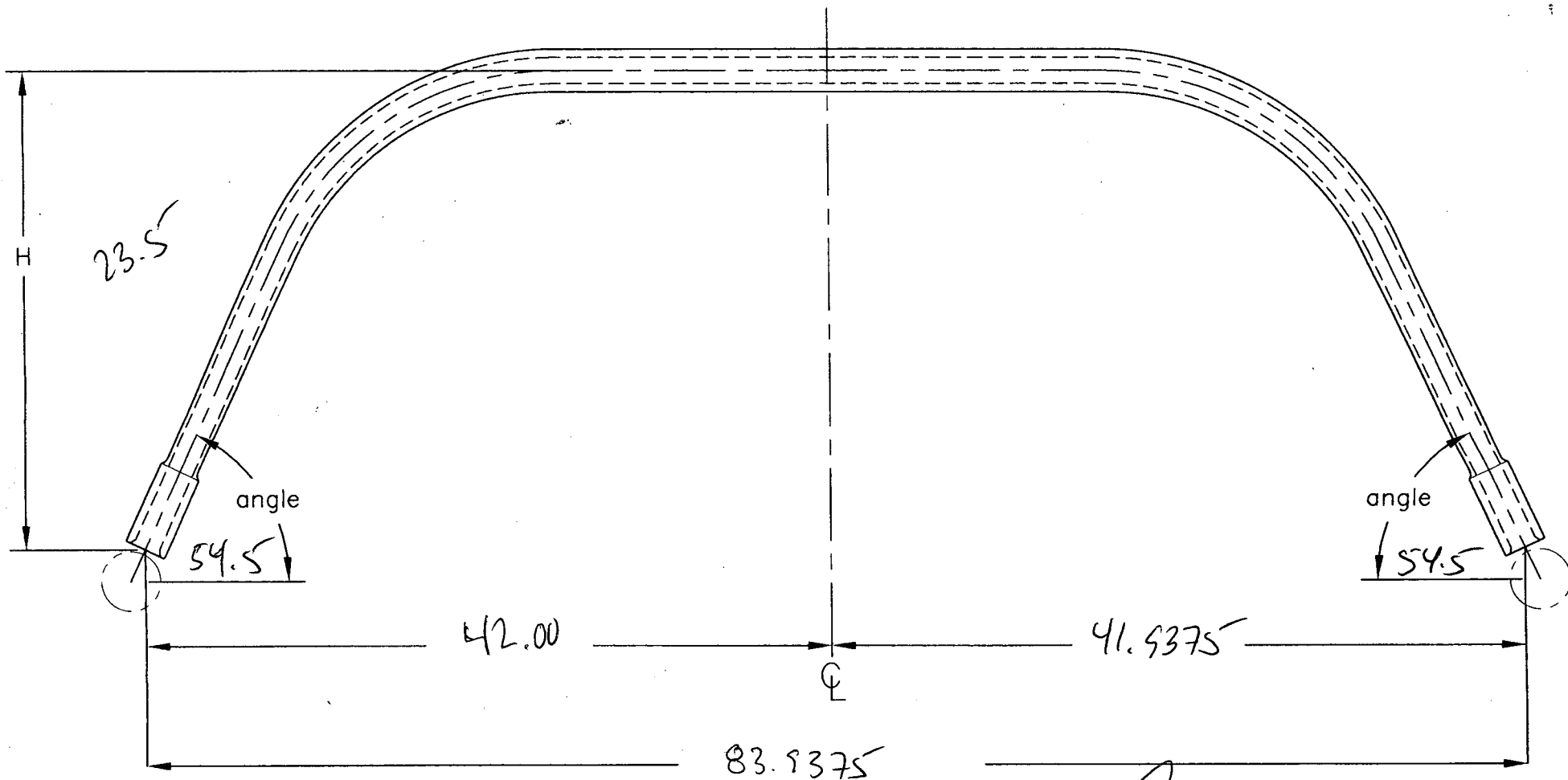
At undertolerance location D:

$$2.238'' \text{ OD} \times 1.750 \text{ ID}, I_D = \pi/64(2.238^4 - 1.750^4) = 0.771 \text{ in}^4$$

$$\text{Distance from skidtube center to location D, } d_D = 3.721''$$

$$MS_D = (0.771 \cdot 27.884 \cdot 1.125) / (0.797 \cdot 3.721 \cdot 1.119) - 1 = 6.29$$

MARGINS positive
∴ parts are OK



DATE: 06.04.20

DESCRIPTION: 206-667-103 ~~Rev. A~~

BATCH NO: 25605

DRAWING: 206-667-143 Rev. B

H: 23.52

1/2 SPAN: 41.92

TOTAL SPAN: 83.84

ANGLE: 54.5

} $\pm .060$

06.04.20



HeathAir

INTERNATIONAL (1991) INC.

681 Ave. Lepine, Dorval, Québec H9P 1G3
Tél.: (514) 636-1000 • Fax: (514) 636-0031

W.O. N° 34062

A.M.O. Number: 46/90

NON-DESTRUCTIVE TESTING REPORT

AIRCRAFT / COMPONENT INFORMATION

REGISTRATION:

MODEL/TYPE:

SERIAL NUMBER:

TOTAL HR/LDG:

OPERATED BY:

BASED AT:

INSPECTION REQUIREMENTS

Carry out FPI of (8) cross tube (external surface) as per ASTM E-1417-05 and the Dart QSI 038, Section 4.1.1 (on file at client) - parts delivered to HeathAir.

Qty (2) P/N D212-664-101 S/N's B26236 & B26237
Qty (2) P/N D212-664-201 S/N's B26241 & B26242
Qty (1) P/N D412-664-203 S/N B24779
Qty (1) P/N D206-667-203 S/N B25609
Qty (2) P/N D206-667-103 S/N's B25605 & B25606

☐ RADIOGRAPHY

☐ ULTRASONIC

☒ PENETRANT

☐ MAGNETIC PARTICLE

☐ EDDY CURRENT

INSPECTION REPORT

Fluorescent penetrant inspection was performed in accordance with the above requirements on (8) cross tubes.

Note: A Level 3 penetrant was substituted for the requested Level 2 (3 is more sensitive)
Ardrox 970P25E Batch #04B503.

(8) cross tubes PASSED inspection.

THE MAINTENANCE DESCRIBED ABOVE HAS BEEN PERFORMED IN ACCORDANCE WITH
THE APPLICABLE STANDARDS OF AIRWORTHINESS

INSPECTED BY: 

DATE April 27, 2006

INSPECTION
STAMP(S) Not Required

CUSTOMER INFORMATION

CUSTOMER Dart Aerospace

P.O. NUMBER 00001076

ADDRESS:

CONTACT NAME:

LABOUR

@

MATERIALS

@

TRAVEL EXPENSES

@

HOTEL EXPENSES

@

GST

PST

INVOICE NO.

TOTAL \$

WHITE COPY - INSPECTION FILE • YELLOW COPY - CUSTOMER • PINK COPY - ACCOUNTANT

